Remarks

A. Pending Claims

Claims 2193-2200, 2202-2239, 2241-2269, 5396-5405, and 5407-5410 are currently pending. Claims 2193-2195, 2200, 2202, 2219-2222, 2224, 2232-2234, 2239, 2241, 2258-2261, 2263, 5409, and 5410 have been amended. The claims have been amended to clarify the claims and/or to correct typographical errors.

B. Double Patenting Rejection

In the Advisory Action mailed April 10, 2003, the Examiner noted that the application was not in condition for allowance because the obviousness double patenting rejections remain outstanding.

In the final Office Action mailed December 24, 2002, claim 2200 and claim 2239 were rejected over claim 564 and claim 565, respectively, pending in application 09/841,437. Applicant believes that amendments to claim 2193 (the independent claim), claim 2200 and claim 2239 added features to claim 2200 and claim 2239 that remove the double patenting rejection noted by the Examiner. Applicant requests reconsideration of the double patenting rejection.

The Examiner also rejected claims 2193-2269 and 5396-5410 over claims 2193-2269 of copending application 09/841,284. Applicant believes that the amendments to claim 2193 and to the other independent and/or dependent claims remove the double patenting rejection noted by the Examiner. Applicant requests reconsideration of the double patenting rejection.

C. Additional Remarks

Applicant submits that all claims are in condition for allowance. Favorable consideration is respectfully requested.

A Fee Authorization in the amount of $1,680.00 is enclosed to cover fees for a three-month extension of time and a Request for Continued Examination. If any additional fees are required or if any fees have been overpaid, please appropriately charge or credit those fees to Meyertons, Hood, Kivlin, Kowert & Goetzel, P.C. Deposit Account Number 50-1505/5659-02400/EBM.

Respectfully submitted,

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Marked-Up Copy Of Amendments Submitted With Request For Continued Examination

2193. (amended) A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heaters disposed in the formation to at least a portion of the formation such that an average heating rate of ~~the~~ a part of the formation is less than about 1 °C per day in a pyrolysis temperature range; and

allowing the heat to transfer from the one or more heaters to ~~a~~ the part of the formation such that a permeability of at least a portion of the part of the formation increases to greater than about 100 millidarcy.

2194. (amended) The method of claim 2193, wherein the one or more heaters comprise at least two heaters, and wherein controlled superposition of heat from at least the two heaters pyrolyzes at least some hydrocarbons ~~within~~ in the part of the formation.

2195. (amended) The method of claim 2193, further comprising maintaining a temperature ~~within~~ in the part of the formation ~~within~~ in a pyrolysis temperature range of about 270 °C to about 400 °C.

2200. (amended) The method of claim 2193, further comprising controlling a pressure and a temperature ~~within~~in at least a majority of the part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

2202. (amended) The method of claim 2193, wherein providing heat from one or more of the heaters to at least the portion of the formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from one or more of the heaters, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons ~~within~~in the selected volume of the formation; and

wherein heating energy/day (*Pwr*) provided to the selected volume is equal to or less than $h*V*C_v*\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate (h) of the selected volume is about 10 °C/day.

2219. (amended) The method of claim 2193, further comprising controlling a pressure ~~within~~in at least a majority of the part of the formation, wherein the controlled pressure is at least about 2.0 bar absolute.

2220. (amended) The method of claim 2193, further comprising controlling formation conditions to produce a mixture from the formation, wherein a partial pressure of H_2 ~~within~~in the mixture is greater than about 0.5 bar.

2221. (amended) The method of claim 2220, wherein the partial pressure of H_2 ~~within~~in the mixture is measured when the mixture is at a production well.

2222. (amended) The method of claim 2193, further comprising altering a pressure ~~within~~in the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

2224. (amended) The method of claim 2193, further comprising:

providing hydrogen (H_2) to the heated part of the formation to hydrogenate hydrocarbons ~~within~~in the part of the formation; and

heating a portion of the part of the formation with heat from hydrogenation.

2232. (amended) A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heaters disposed in the formation to at least a portion of the formation such that an average heating rate of ~~the~~ a part of the formation is less than about 1 °C per day in a pyrolysis temperature range; and

allowing the heat to transfer from the one or more heaters to ~~a~~ the part of the formation ~~such that~~to increase a permeability of a majority ~~of at least a portion~~ of the part

of the formation ~~increases and~~ such that the permeability of the majority of the part is substantially uniform.

2233. (amended) The method of claim 2232, wherein the one or more heaters comprise at least two heaters, and wherein controlled superposition of heat from at least the two heaters pyrolyzes at least some hydrocarbons ~~within~~in the part of the formation.

2234. (amended) The method of claim 2232, further comprising maintaining a temperature ~~within~~in the part of the formation ~~within~~in a pyrolysis temperature range of about 270 °C to about 400 °C.

2239. (amended) The method of claim 2232, further comprising controlling a pressure and a temperature ~~within~~in at least a majority of the part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

2241. (amended) The method of claim 2232, wherein providing heat from one or more of the heaters to at least the portion of the formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from one or more of the heaters, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons ~~within~~in the selected volume of the formation; and

wherein heating energy/day (Pwr) provided to the selected volume is equal to or less than $h*V*C_v*\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate (h) of the selected volume is about 10 °C/day.

2258. (amended) The method of claim 2232, further comprising controlling a pressure ~~within~~in at least a majority of the part of the formation, wherein the controlled pressure is at least about 2.0 bar absolute.

2259. (amended) The method of claim 2232, further comprising controlling formation conditions to produce a mixture from the formation, wherein a partial pressure of H_2 ~~within~~in the mixture is greater than about 0.5 bar.

2260. (amended) The method of claim 2232, further comprising producing a mixture from the formation, wherein a partial pressure of H_2 ~~within~~in the mixture is measured when the mixture is at a production well.

2261. (amended) The method of claim 2232, further comprising altering a pressure ~~within~~in the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

2263. (amended) The method of claim 2232, further comprising:

providing hydrogen (H_2) to the heated part to hydrogenate hydrocarbons ~~within~~in the part; and

heating a portion of the part with heat from hydrogenation.

5409. (amended) The method of claim 5404, further comprising controlling a pressure and a temperature ~~within~~in at least a majority of the pyrolysis zone, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

5410. (amended) The method of claim 5404, wherein providing heat from the heaters to the portion of the formation comprises:

heating a selected volume (V) of the formation from one or more of the heaters, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons ~~within~~in the selected volume of the formation; and

wherein heating energy/day (Pwr) provided to the selected volume is equal to or less than $h*V*C_v*\rho_B$, wherein ρ_B is formation bulk density, and wherein an average heating rate (h) of the selected volume is about 10 °C/day.